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FLUID TRANSMISSION OR FLUID CLUTCH FOR MOTOR VEHICLES
[Flüssigkeitsgetriebe oder Flüssigkeitskupplung für Kraftfahrzeuge]

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In the case of fluid clutches and/or torque converters for motor vehicles, when an excessive heating of the clutch fluid occurs, the drive, according to the prior art, can be interrupted automatically by the fluid clutch. For example, according to the prior art, a melting plug can be located in the housing of the fluid clutch, said melting plug melts at a defined temperature of the clutch fluid and allows said fluid to run out. Likewise it is known that the run out of the clutch fluid can be controlled by a thermostat and the emerging fluid can be collected in a special container, and then after cooling thereof, the fluid is pumped back into the fluid clutch automatically. All these devices have the disadvantage that during the time which is needed for cooling of the clutch fluid, the clutch between the engine and transmission of the vehicle is interrupted and the vehicle thus cannot be driven during this time.

This disadvantage can be prevented of course, in a known design in that as the temperature of the clutch fluid rises, the quantity of the clutch fluid increases and the replacement of the fluid is accelerated. However, this design has the disadvantage that under certain circumstances, it must operate with very large volumes of fluid.

According to the invention, the potential for continual driving can be achieved with small volumes of clutch fluid in that the friction clutch for engaging of the pump unit with the turbine unit in the known manner can be actuated by a hydraulic fluid conveyed by a pump driven by the engine, wherein the conveyance of the hydraulic fluid between the friction clutch and the pump is controllable by a thermostat installed in the known manner in the cycle of the fluid transmission or the fluid clutch.

The figure shows one design embodiment of the invention in a schematic illustration. We have:

Figure 1 is a fluid clutch with attached multiple disk clutch, in longitudinal cross section

Figure 2 is a gear-type pump, cut along line A-B of Figure 1

Figure 3 is a thermostat with the housing, in cross section, with multiple disk clutch switched off

Figure 4 is a slider valve according to Figure 3 with multiple disk clutch engaged.

The pump wheel cover 2 is screwed to the pump wheel 1 of the fluid clutch and also to the crankshaft 3. The turbine wheel 6 is secured onto the flange 4 of the turbine wheel shaft 5. The disks 7 are moved along in a known manner by the splined hub 9; the disks 8, by the splined hub 10. The splined hub 10 rests against the outer cylinder of the ring-shaped piston 11. The piston 11 is prevented from rotating by the hub 12 and is displaced by the coil spring 13 into the illustrated position.

The geared pump 14 located in the housing 15 is driven by the pump wheel shaft. On the left side, the turbine wheel shaft is seated by the ball bearing 16 in the hub of the pump wheel cover. The bearing of the turbine wheel shaft on the right side and also the housing encasing the fluid clutch are not shown.

The oil tank 17 is positioned around a portion of the geared pump. The thermostat housing 18 is screwed to the housing 15.

In the thermostat housing (Figure 3) there is the corrugated tube 19 of the thermostat whose lower end is joined to the valve 20.

The overflow valve 21 and the three-way stopcock 22 are located at the outlet side of the geared pump (Figure 2). The three-way stopcock is circuited in parallel with the rotary valve 23 (Figure 3).

Now when stopping on an incline, if the driver prevents the vehicle from rolling back by allowing the engine to continue to run (with gear selected) instead of by applying the brake, then the oil volume in the fluid clutch more or less quickly rises to an unacceptably high temperature, depending on the power requirements. When driving uphill with a large slip produced by an improper driving mode, this effect will occur. The greater the slip, the greater also the flow within the fluid clutch according to the indicated arrows. In this case, a portion of the oil flows through several tubes 24 located in the turbine wheel into the hollow turbine wheel shaft, from there through the cavity 25 through the opening 26 into the cavity 27 of the thermostat (Figure 3), whose corrugated tube 19 is flushed. From the opening 28 a

tube line (not illustrated) leads to the short pipe 29 (Figure 1). From there, the oil flows in the enclosed loop back through the holes 30 and 31 to the pump wheel.

The second oil cycle produced by the geared pump flows from the geared pump through the short pipe 32, the annulus 33 of the valve 20, through the short pipe 34 to the oil tank 17.

Now if the oil temperature of the oil cycle extracted from the fluid clutch becomes too high, then the valve 20 moves in direction E (Figure 4), so that the connection is established between oil pump and multiple disk clutch.

In this case, the oil flows through the short pipe 35, the rotary valve 23 and a pipeline (not shown) to the short pipe 36 (Figure 1), from there through the hole 37 into the tube 38 located in the hollow turbine wheel shaft, continuing through the hole 39 of the pump wheel cover into the annulus of the piston 11 and/or its cylinder chamber.

Due to the oil pressure, the piston overcomes the force of the spring 13 and moves to the right, so that the disks are engaged and the pump wheel and turbine wheel are coupled.

After the coupling, the vehicle, if previously stopped, starts up, provided the selected gear corresponds to the gear needed for startup, otherwise the engine will stall.

If the vehicle was in a slow-moving state when engaging [the clutch], then the speed of the accelerator setting will be increased accordingly.

If this state is to persist, then the driver is compelled to press down the clutch pedal and to apply the brake or to shift the gear to neutral. After the oil in the fluid clutch has cooled, the multiple disk clutch will disengage automatically, so that the oil cycle according to Figure 3 will be re-established.

Now in order to be able to switch off the fluid clutch or the converter at any time as desired, the three-way stopcock 22 and the rotary valve 23 are built in. Both are necessarily circuited in parallel.

During a rotation of the three-way stopcock by 90° in the direction of the arrow, the oil flows from the short pipe 40 of the three-way stopcock through a tube line (not illustrated) to the short pipe 36. The rotary valve 23 is thus closed so that no oil can flow back from the multiple disk clutch.

After engaging of the multiple disk clutch, the overflow valve 21 is actuated and the excess oil flows back into the oil tank 17.

The multiple disk clutch can be located outside of the fluid clutch, as shown. However, said multiple disk clutch can also be installed in the fluid clutch.

Claim

Fluid transmission or fluid clutch for motor vehicles with a pump wheel and a turbine wheel which can be engaged together by a friction clutch, wherein the friction clutch is actuated by a hydraulic fluid conveyed by a pump driven by the engine, characterized in that the conveyance of the hydraulic fluid between the friction clutch (7-12) and the pump (14) is controllable by a thermostat (19) installed in a known manner in the circuit of the fluid transmission or the fluid clutch.

Publications taken into account:

German patent specifications No. 883 567, 705 118, 927 722;

Swiss patent specification No. 210 941;

French patent specification No. 860 103.

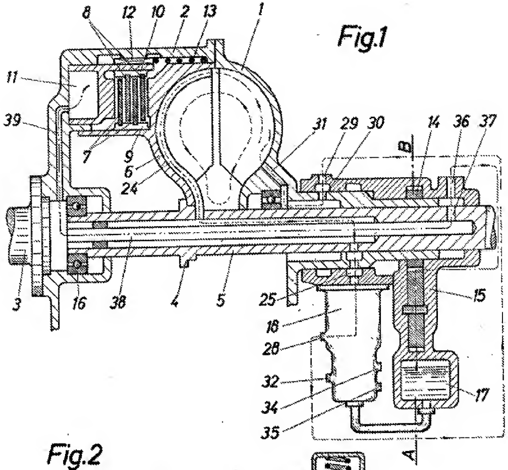

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Fig.1

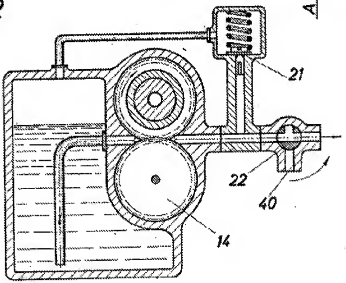

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Fig.2

Fig.3

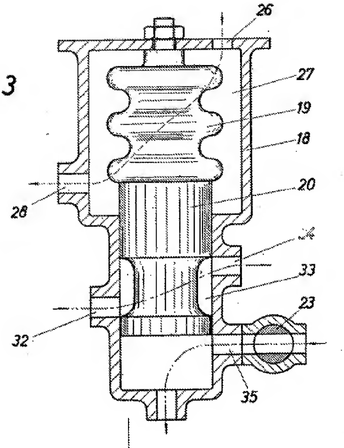

Fig.4